Cashew

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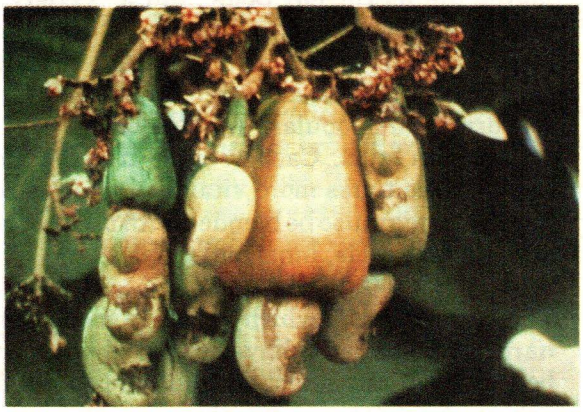


CROP PROFILE

SPECIES AND VARIETIES

- The cashew tree, *Anacardium occidentale* L., belongs to the Anacardiaceae family, which also includes mango, pistachio, and poison ivy. It is a native of Brazil and is also grown in Asia, Africa, and other tropical areas. In the United States, this plant can be found on the southern tip of Florida. Although 180 ac were planted on Oahu by Maunawili Ranch as a forestry experiment in the early 1930s, a commercial cashew industry has never been established in Hawaii.

- The varieties of a cashew are often distinguished by the color (red or yellow) and shape (round, pear-shaped or elongated) of the swollen pedicel (cashew apple) to which the nut is attached. Locally recognized varieties are given names unique to their growing areas.

- Research on selection and breeding of cashews is relatively new. Various research stations in India conduct trials to identify and develop the most productive varieties. In Australia, the Queensland Department of Primary Industries is comparing Australian seedlings with those imported from Asia, Africa, and New Guinea during the early 1970s.

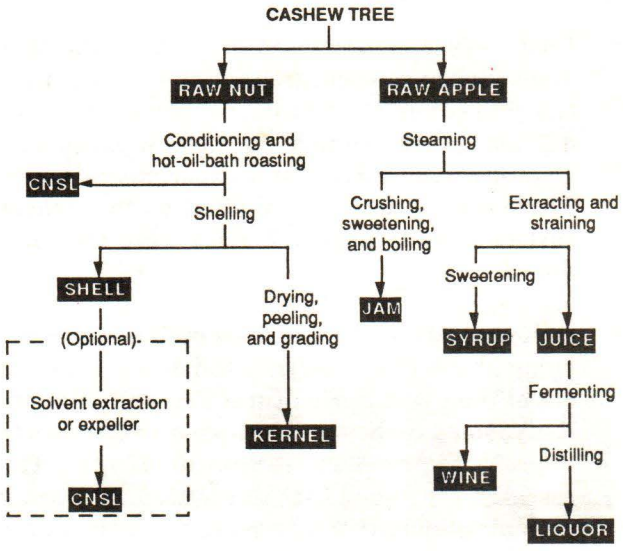
USES AND PRODUCTS

- The cashew nut is the main product from the cashew tree. Unroasted and unshelled nuts should not be eaten raw. The shell contains an oily, caustic substance known as cashew nut shell liquid (CNSL), which can cause severe skin reactions, such as blistering and swelling, upon contact. The nut is heated before the kernel is extracted, to render the oil less caustic.

- The cashew kernel is marketed as a snack food. It is also used in the confectionery and bakery industries. The kernel is considered highly nutritious and is rich in protein (21.2 percent by weight), carbohydrates (22.3 percent), and fats (46.9 percent).

- There are more than 200 patents for various industrial uses for the CNSL. An important use is as a friction-modifying material for automobile brake linings. It is also used in making heat- and waterproof paints, varnishes, and lacquers. The CNSL can also substitute for linseed oil in the manufacture of foundry core oil and has potential as a base in pesticides and drugs.

- The cashew apple can be eaten raw, but generally not more than two or three are consumed at a time, since it has an astringent taste and can irritate the mouth. Steaming the apples re-



Processing Chain of Cashew Nut and Apple

moves the astringent taste, and a variety of products such as jam, jelly, syrup, juice, and alcoholic and nonalcoholic beverages can be produced. In Brazil and Argentina, a wine and soft drinks are popular. A liquor called Feni is produced in India. Cashew apple juice contains two to three times more vitamin C than citrus juices and may also be blended with other juices such as pineapple, lime, and mango.

- The cashew wood, which is soft to moderately hard, is considered to have limited value as timber. It is termite-resistant and can be used for boat-making, fence posts, packing crates, and a fairly good quality charcoal.

- An amber-like cashawa gum exudes from incisions in the tree. This gum has insect-repellent properties and can be used for bookbinding. It can also substitute for gum arabic as an adhesive.

PRODUCTIVITY

- Cashew trees can grow under conditions unfavorable to many other fruit and nut trees in the tropics. They are drought-tolerant and capable of surviving with only 20 inches of rain per year. The cashew can be cultivated in a wide variety of soils and is often planted on marginal lands. The major limiting factor for its growth is the inability to withstand frost.

- Cashews become productive in two to four years when grown from seeds and one to two years when vegetatively propagated. Maximum yields are obtained between nine and 20 years.

- Cashews are sometimes interplanted with other crops such as cowpea, groundnut, teak, eucalyptus, and coconut. In India, pepper vines (*Piper nigrum*) were trained up cashew trees and showed promising results in experimental trials. There was no detrimental effect on the yield of cashews, while pepper berries were also produced.

- In Kenya, the yield of cashew nuts is low, averaging about 18 lb/tree/yr. Studies were carried out at the Coast Agricultural Research Station, Kenya, on a cashew-animal-pasture complex to improve the productivity per unit area. The research concluded that this system of grazing animals under cashews was economically viable for farmers in the region.

- Most of the world's cashews have been propagated by seeds. This can lead to heterogeneous plantings and a wide variation in productivity between trees, since cashew flowers favor cross-pollination over self-pollination.

- The yield of unshelled nuts from mature trees can vary from 890 lb/ac to 4020 lb/ac. The spacing of trees is 40' × 40' to 50' × 50'. Trees can be spaced 20' × 20', but would require thinning as they grow larger.

- Cashew nuts are hand-harvested after they have fallen to the ground. Mechanical harvesting should be possible by using U.S. nut harvesters or by developing similar machines.

- The shell accounts for most of the cashew nut's weight (66–80 percent), followed by the kernel (19–32 percent), and the peel covering the kernel (1–4 percent). Shelling the nut is difficult because of its irregular shape, its tough, leathery shell, and the need to prevent CNSL contamination of the kernel. In the past, shelling was always done manually, but more recently several mechanical devices have been developed. One system uses a centrifuge in which nuts are thrown against a wall to crack the shell.

- In the shell cracking process, it is important to obtain whole kernels, as they receive a higher price than broken kernels. Mechanical shelling devices can produce up to 85 percent whole kernels.

- Although the actual content of the CNSL is 20–25 percent of the raw nut weight, only 7–12 percent is recovered as CNSL using the hot-oil bath extraction method, one of the more common techniques. Extraction efficiency can be improved to about 80 percent through other methods (e.g., solvent extraction or mechanical expulsion), which are expensive and require large quantities of nuts to be economical.

- Raw cashew nuts can be stored for up to two years after drying. Processed kernels can maintain their quality for one year or longer when stored in evacuated or carbon dioxide-treated containers.

- About 5–10 lb of cashew apples are available for every pound of nuts. The astringency of the apples appears to vary among different trees and across species.

- Among the major diseases of cashew trees are inflorescence blight, caused by the tea mosquito (*Helopeltis antonii*); die-back or pink-disease, caused by *Pellicularia salmonicolor* or *Corticium salmonicolor*; damping-off of seedlings, caused by *Phytophthora palmivora* and other fungi; and anthracnose, caused by *Colletotrichum gloeosporioides*. The major pests include tea mosquitos, stem and root borers (*Plocaederus ferrugineus*), leaf miners (*Acrocercops syngramma*), and leaf and blossom webbers.

WORLD SUPPLY AND DEMAND

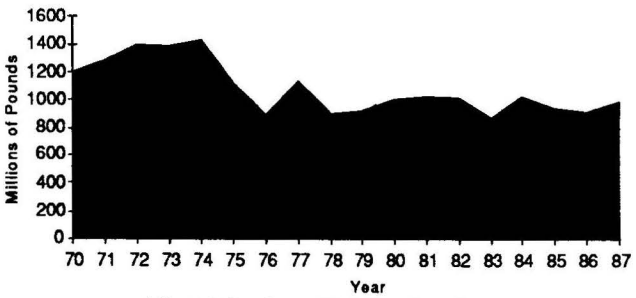
SUPPLY

- World cashew nut production decreased from 1.2 billion lb in 1970 to an estimated 989 million lb in 1987. In 1987, India (352 million lb) and Brazil (286 million lb) were the major cashew nut producers, accounting for 65 percent of the total production. Other major producers include Nigeria (81 million lb), Mozambique (66 million lb), Indonesia (55 million lb), and Tanzania (44 million lb). Brazil and India are also the major producers of CNSL.

- Mozambique and Tanzania together accounted for an average of 49 percent of the world's cashew production during the 1970s. By 1987, these two countries represented only 11 percent of the world production. The Brazilian share of production, however, has gone from an average of 8 percent during the 1970s to 29 percent in 1987.

- Thailand produced 15 million lb of cashew nuts in 1987, less than 2 percent of the total world production. In 1984, a project was initiated to produce cashews on a large scale. The goal is to enlist enough private farmers and landless peasants to plant more than 175,000 ac in cashews by 1995.

- Cashew kernels are graded according to condition and size. Types include "white," "scorched," and "dessert." "White" kernels are white or pale and are the highest in quality. "Scorched" kernels are over-roasted with a light brown color. "Dessert" kernels, the lowest in quality, are allowed to have brown and black spots and may be scorched and shrivelled. Each type is then divided into whole or broken grades (i.e., "splits" are broken lengthwise, "butts" are broken crosswise, and "pieces" are broken into more than two parts) and are further subdivided according to size.



World Cashew Nut Production

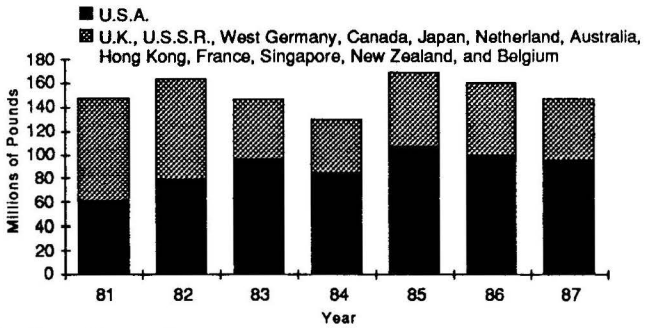
- Large whole white kernels fetch the highest prices. Whole white kernels are classified according to the count per pound (e.g., W320 specifies 300 to 320 kernels per pound). In 1987, the average monthly New York spot prices per pound for whole white kernels were: $3.94 for W210, $3.48 for W240, $3.35 for W320, and $3.25 for W450. The price for both butts and splits was $3.07/lb, and the price for large white pieces was $2.30/lb.

DEMAND

- Cashew is one of the major tree nuts traded in the world. Annual total imports of cashew kernels by the 13 major consuming countries usually exceed 145 million lb.

- The largest market for cashews is the United States, which imported 94 million lb of cashew kernels in 1987. Other major importers were the United Kingdom (8 million lb), the Soviet Union (6.8 million lb, from India only), West Germany (6.2 million lb), Canada (6 million lb), and Japan (6 million lb).

- The United States and most of the Western European countries consume cashew kernels primarily as a snack food. For the snack market, whole kernels are preferred because they are visually more attractive than broken kernels. In the Soviet Union, broken kernels are also well accepted, since cashews are used mostly in confectionery products.



Cashew Kernel Imports of 13 Major Consuming Countries

THE UNITED STATES MARKET

- U.S. per capita consumption of tree nuts (shelled basis) increased from 1.74 lb in 1978 to an estimated 2.41 lb in 1987. Almonds (0.57 lb/capita), pecans (0.56 lb/capita), and walnuts (0.51 lb/capita) were the leading nuts consumed in 1987. During the same year, the combined per capita consumption of cashews, Brazil nuts, pignolias, chestnuts, and miscellaneous nuts was estimated at only 0.49 lb.

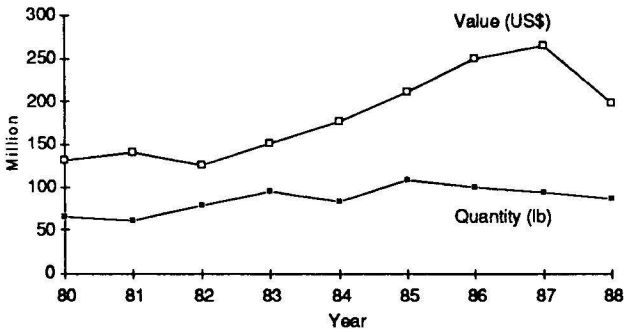
- A variety of cashew products are imported into the United States. Shelled cashew nuts are imported in the largest quantity. Specific data on imports of cashew apple products cannot be determined, since the statistics are aggregated with data for products of other crops.

U.S. Imports of Cashew Products, 1988

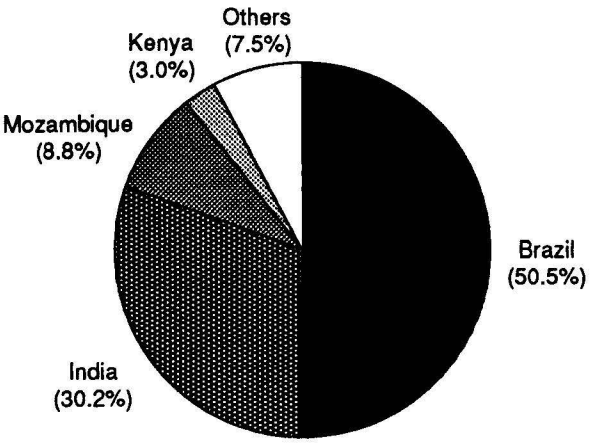
Product	Quantity (1000 lb)	FAS Value ($1000)
Cashew nuts		
Shelled	83,670	191,800
Not shelled	1,857	3,905
Prepared or preserved	455	1,217
Cashew nut shell liquid	17,196	3,626
Cashew apple		
Fruit paste and pulp†	1,375	610
Fresh, prepared, or preserved†	467	229
Jellies, jams, etc.†	117	123

† Also includes data for Mamey Colorado, Sapodilla, Soursop, and Sweetsop.

- The quantity of cashew nuts imported into the United States increased from 66 million lb in 1980 to 108 million lb in 1985, then declined to 86 million lb in 1988. During the same period, the value of the imports peaked at $265 million in 1987 before dropping to $197 million in the next year.



U.S. Imports of Cashew Nuts



Major Suppliers of Shelled Cashews to the U.S., 1988

- Major suppliers of shelled cashew nuts in 1988 were Brazil (41.8 million lb), India (25.3 million lb), and Mozambique (7.4 million lb). Brazil and India were also the major suppliers of unshelled cashew nuts, accounting for 1.6 million lb of the 1.9 million lb imported. Over 17 million lb of CNSL were also imported, of which Brazil accounted for 94 percent.

- The primary U. S. outlet for cashew kernels is the roasted and salted nut market, where cashews are sold straight or in nut mixes. Honey-roasted cashews have also recently been introduced in the market. The remaining kernels are used by the confectionery and bakery industries.

- Many of the cashew importers in the United States are on the East Coast. The Journal of Commerce publishes the *United States Importers & Exporters Directory*, which lists various importers of cashews in the United States.

- Planters, Fisher Nut, and Eagle Snacks are some of the larger snack food companies that market cashews. Among other firms are Ace Pecan, Allen Foods, Inc., Pennsylvania Dutch Co., Inc., and Sanfillippo, J.B. and Son, Inc.

- Colloid Chemical, Inc., in New Jersey is a major importer of CNSL. The firm manufacturers CNSL resins and friction fortifying particles that are used in such products as automobile brake linings, tires, shoes, floors, and roofs.

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